MINING FOR DATA

How can you convert data into knowledge needed to make better predictions and decisions?

AbTech Corporation of Charlottesville, Virginia has developed advanced system-level diagnostics software. The firm's ModelQuest™ System Validator software was initially created for the Dryden Flight Research Center (DFRC) under a Small Business Innovation Research (SBIR) grant. The software was written to assist system engineers in validating an automated research flight control system for the F-18 High Alpha Research Vehicle (HARV). Barron Associates modified NASA's F-18 HARV simulation software for this project.

In the commercial world, there are many types of control systems. Costs can run into the millions for validation of complex systems. For example, Boeing, Lockheed Martin, and other industry giants spend between one and seven person-hours per line of code on the validation process. Although some costs are reduced by streamlining the process, a streamlined process does not eliminate the need for extensive validation.

The diagnostics software is applicable to aircraft flight control systems, engines, manufacturing processes, medical signal processing, and mechanical equipment for:

- Validation of new and modified systems and simulations;
- System-level diagnostics (anomaly detection, isolation, prediction);
- Comparative signal analysis (satellite telemetry, financial time-series and medical diagnostics).

In simple terms, the diagnostic software reduces the time and cost of validation and diagnosis of complex analog systems, increases confidence in the validity of the systems, and automates the development of superior system-level diagnostic mathematical models. It applies the mathematical-modeling techniques to "overplots" of hundreds of simulated anomalous signals with "truth" signals to learn automatically the differences between normal and anomalous systems.

Given recorded signals from a system being evaluated, the resulting software overplot analysis models identify the probability that a design anomaly or failure exists, estimate the level of degradation of performance, and attempt to isolate the cause of anomaly or failure.

The highly automated capability of this software can yield a striking reduction in the time needed to validate critical systems or substantially increase the level of fault detection and isolation.

Successful applications include decision support that recommends treatments for grasshopper infestation. In the area of healthcare, a savings of 60 percent was achieved in a commercial hearing test product. As a stock market prediction application, AbTech's data mining tools have proven the fastest and easiest to use over six different neural network products—and provided by far the best results.

"Improvements in information technology are motivating business and technical professionals to rethink their strategies to discover better information to compete more effectively," comments Gerard Montgomery, AbTech's President and Chief Executive Officer. "AbTech is poised to capitalize on this rapidly growing industry by delivering superior data mining tools to companies that realize the need to analyze and understand their data," he concludes.

In its sixth consecutive year as a profitable data mining software company, AbTech has grown since 1992 to have a customer base of over 4,000.

™ ModelQuest is a trademark of AbTech Corporation.

Data mining software tools empower users with decision and prediction skills. The tool can be applied to development of flight controls for high performance aircraft.